

REMARKS

By this Response, no claims are amended, added or cancelled. Claims 1-13 and 16-20 remain pending in the patent application. Reconsideration and allowance of the present patent application based on the following remarks are respectfully requested.

Claims 1-10, 13 and 16-20 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent Application Publication Number 2003/0038225 to Mulder *et al.* ("Mulder") in view of U.S. Patent No. 6,231,198 to Foo ("Foo"). The rejection is respectfully traversed.

Applicant submits that the cited portions of Mulder and Foo fail to disclose or render obvious a lithographic apparatus including, *inter alia*, an illumination system comprising a reflective integrator disposed along an optical axis of the lithographic apparatus, the reflective integrator having a rectangular cross-section perpendicular to said optical axis, the cross-section having sides parallel to mutually perpendicular X and Y axes; and an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes, as recited in claim 1.

First, Applicant submits that the Office Action has not set forth a proper reasoned basis or sufficient evidence as to how and why the claimed invention would have been obvious from the combination of the cited portions of Mulder with the divergent teachings of the cited portions of Foo. Rather, Applicant submits that the cited portions of Mulder and Foo are not properly combinable.

For example, Applicant submits that such a combination would have changed the principle of operation of Mulder and have required the prohibited use of hindsight gleaned from Applicant's disclosure. The Office Action alleges that it would be obvious to replace the divergence optics 32 of Mulder with the parabolic reflective fly's eye array 500 of Foo. It would have not. Mulder's divergence optics 32 is arranged to refract radiation from laser 31 to produce an expanded collimated beam of sufficient size to be incident on all reflective elements 33a to 33e. *See*, ¶[0075] of Mulder. In contrast, Foo's parabolic array 500 is arranged to reflect radiation from source 506 to produce an array of secondary point sources for use in an optical system. *See*, column 2, lines 32-34 of Foo. Thus, since Mulder and Foo operate using different optical principles (Mulder's divergence optics 32 operates by

refraction and Foo's parabolic array operates by reflection), the alleged combination would have changed the principle of Mulder, thus rendering the combination insufficient to render the claims prima facie obvious. *See*, MPEP §2143.01.

The alleged substitution is also improper because Mulder's divergence optics 32 and Foo's parabolic array 500 have completely different functions and are not properly substitutable. The divergence optics 32 of Mulder acts to collimate the beam, i.e., to make the rays substantially parallel. In stark contrast, the parabolic array 500 of Foo is arranged to produce a plurality of secondary source images, which is not a radiation beam wherein the rays are substantially parallel as clearly seen in, for example, FIGS. 5A-D of Foo. Indeed, FIG. 5B of Foo shows that collimated radiation 504 (like the radiation produced by divergence optics 32 of Mulder) is incident on Foo's parabolic array 500.

Moreover, no reasoned basis from the cited art or other evidence suggests extracting the particular teachings from Foo that were extracted in the Office Action and combining those selectively extracted features with the divergent teachings of Mulder. It appears as though the Office Action has relied upon the prohibited use of hindsight gleaned from Applicant's disclosure.

Nevertheless, even if Mulder and Foo are properly combinable (which Applicant does not concede), the cited portions of Foo fail to remedy the deficiencies of the cited portions of Mulder. The cited portions of Foo merely disclose an optical integrator 500 comprising a two dimensional array of mirror segments 502 formed from an off-axis section of a parent parabolic surface 512. The Office Action specifically cites column 8, lines 49-50 of Foo to teach the aspect of the Foo integrator having sides parallel to mutually perpendicular X and Y axes. However, the Office Action has mischaracterized these two lines of Foo.

First, the cited portion of Foo does not disclose sides parallel to mutually perpendicular X and Y axes. It merely states a two-dimensional array of mirror segments without any teaching regarding whether the two dimensions are perpendicular or whether the two dimensions relate to the sides of the integrator. Further, the portion of Foo immediately after the cited portion states "wherein each of said mirror segments has a reflecting surface shape based on an off-axial segment of a parent parabolic surface." Thus, the description of a two-dimensional array that the Office Action relies upon is merely a planar-type configuration of a plurality of curved mirror segments. These plurality of curved mirror segments 502 teach away from the recited aspects of the reflective integrator having a rectangular cross-section perpendicular to the optical axis, the cross-section having sides

parallel to mutually perpendicular X and Y axes. For example, see Figure 8 of Foo which clearly shows the generally curved structure of the mirror segments.

For at least these reasons, it is respectfully submitted that claim 1 is patentable over the cited portions of Mulder and Foo, either taken individually or in combination. Claims 2-10 are patentable over the cited portions of Mulder and Foo, either taken individually or in combination, *at least* by virtue of their dependency from claim 1, and for the additional features recited therein.

Claim 13 is patentable over the cited portions of Mulder and Foo, either taken individually or in combination, for *at least* similar reasons as provided above in connection with claim 1 and for the features recited therein. Namely, claim 13 is patentable over the cited portions of Mulder and Foo, either taken individually or in combination, *at least* because this claim recites an illumination system including a reflective integrator disposed along an optical axis, the reflective integrator having a rectangular cross-section perpendicular to said optical axis, the cross-section having sides parallel to mutually perpendicular X and Y axes; and an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes. Claims 17-20 are patentable over the cited portions of Mulder and Foo, either taken individually or in combination, *at least* by virtue of their dependency from claim 13, and for the additional features recited therein.

Similarly, claim 16 is patentable over the cited portions of Mulder and Foo, either taken individually or in combination, for *at least* similar reasons as provided above in connection with claim 1 and for the features recited therein. Namely, claim 16 is patentable over the cited portions of Mulder and Foo, either taken individually or in combination, *at least* because this claim recites a lithographic apparatus comprising, *inter alia*, an illumination system configured to condition a beam of radiation, wherein the illumination system comprises a reflective integrator disposed along an optical axis of the lithographic apparatus, the reflective integrator having a rectangular cross-section perpendicular to said optical axis, the cross-section having sides parallel to mutually perpendicular X and Y axes, and an optical element, constructed and arranged to redistribute an intensity distribution exiting the reflective integrator such that the intensity distribution is asymmetric with respect to at least one of the X and Y axes.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-10, 13 and 16-20 under 35 U.S.C. §103(a) based on Mulder in view of Foo are respectfully requested.

Claims 11 and 12 stand rejected under 35 U.S.C. §103(a) based on Mulder in view of Foo and in further view of U.S. Patent No. 6,102,554 to Willson *et al.* ("Willson"). The rejection is respectfully traversed.

First, claims 11 and 12 depend from and claim additional aspects from claim 1. Thus, claims 11 and 12 are allowable over Mulder and Foo *at least* by virtue of their dependency from an allowable base claim, and for the additional aspects they recite. Moreover, the cited portions of Willson fail to remedy the deficiencies of the cited portions of Mulder and Foo, as explained above. The cited portions of Willson merely disclose an apparatus for modifying a light beam. Thus, any proper combination of the cited portions of Mulder, Foo and Willson cannot result, in any way, in the invention of claims 11 and 12.

Accordingly, reconsideration and withdrawal of the rejection of claims 11 and 12 under 35 U.S.C. §103(a) based on Mulder and Foo in view of Willson are respectfully requested.

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975 under our order no. 081468/0309024. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,


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